(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 110 681 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.06.2001 Bulletin 2001/26

(51) Int Cl.[7]: **B26D 1/16**, B26D 3/16

(21) Application number: **00203817.2**

(22) Date of filing: **01.11.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **09.11.1999 IT MI992338**

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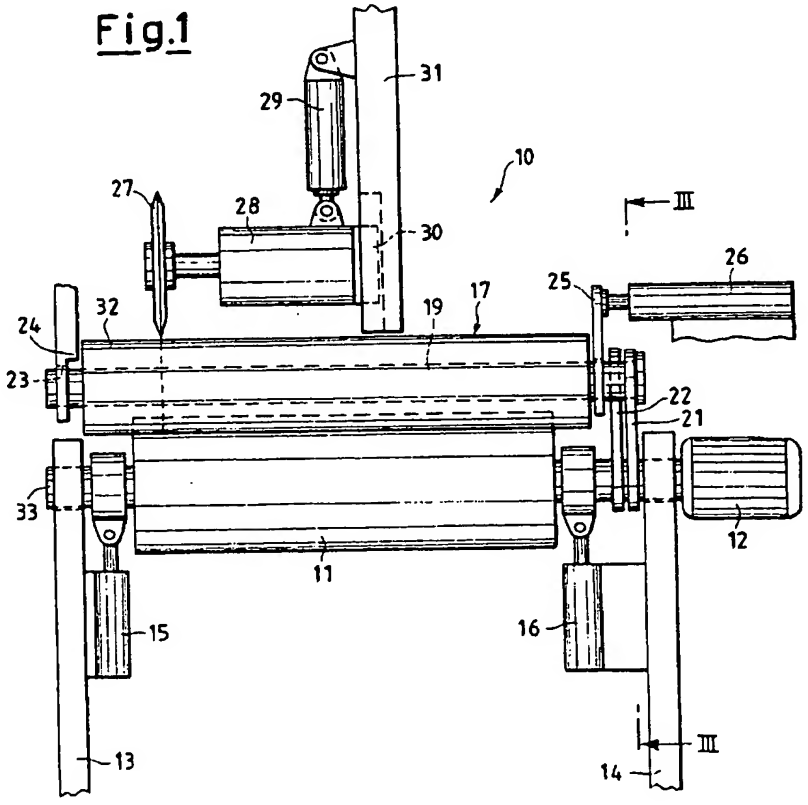
(54) Device for cutting rolls of paper

(57) A device (10) for cutting rolls of paper comprises at least one cutting blade (27) for cutting at least one stick (17, 18), from which to obtain rolls of paper and has means for imposing a relative rotation between the stick (17, 18) and the cutting blade (27) during cutting.

Fig.1



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Descripti n

[0001] The subject of the present invention is a device for cutting rolls of paper.

[0002] It is known that in the production of paper in rolls, such as rolls of toilet paper, paper towels and the like, the paper is wound on cardboard cores and forms rolls of large linear dimensions referred to as sticks.

[0003] The sticks are subsequently cut according to planes orthogonal to their own axes to form rolls of smaller dimensions and of commercial format.

[0004] This cutting operation is generally carried out using a basically disk-shaped rotating blade which is made to oscillate between a first, top, end-of-travel position and a second, bottom, end-of-travel position of cutting operation.

[0005] Although the devices of the type described above are able to perform the function for which they are designed, they present a number of major drawbacks. In the first place, cutting of the stick of paper is not perfectly precise owing to the fact that the stick has to be traversed throughout its thickness by the cutting blade, a fact which causes excessive play between the cutting blade and the stick.

[0006] In addition, precisely on account of this cutting system, disk-shaped blades of considerable size, and generally produced purposely for this function, must be used, with consequent high costs.

[0007] A purpose of the present invention is therefore to provide a device for cutting rolls of paper which can overcome the said problems, enabling optimal performance of the operation of cutting sticks of paper.

[0008] Another purpose of the present invention is to provide a cutting device which enables greater cutting precision as compared to what has been so far possible. These and other purposes are achieved by a device for cutting rolls of paper, according to Claim 1, to which the reader is referred for reasons of brevity.

[0009] Further characteristics of the present invention are moreover defined in the subsequent claims.

[0010] Further purposes and advantages of the present invention will emerge clearly from the ensuing description and from the annexed drawings, which are provided purely to give an explanatory and non-limiting example, and in which:

- Figure 1 is a front view of the device for cutting rolls of paper according to the present invention;
- Figure 2 is a side view of the device according to the invention, taken from the side of the cutting blade;
- Figure 3 is a sectional side view of the device according to the invention, taken in the plane III-III of Figure 1; and
- Figure 4 is a schematic sectional view of the end-of-travel position of the cutting blade with respect to the other components of the device according to the invention.

[0011] With particular reference to the above-mentioned figures, the device for cutting rolls of paper according to the present invention is designated, as a whole, by the reference number 10.

[0012] The device 10 has a feed roller 11 driven in rotation about an axis 33 by a motor 12 and supported by supports 13 and 14.

[0013] The feed roller 11 also has actuators 15 and 16 for modifying its own position in a substantially vertical direction.

[0014] The sticks of paper 17 and 18, which are to be cut to give rise to rolls of paper in commercial format, engage on the feed roller 11.

[0015] Inside the cardboard core of the sticks 17 and 18 there are present metal supporting bars, designated by the reference numbers 19 and 20.

[0016] The bars 19 and 20 may be provided with holes for blowing of air under pressure, so as to create a cushion of air between the core and the bar, a fact which reduces friction between the two and favours rotation of the stick on the bar.

[0017] On one side of the device 10, the bars 19 and 20 are supported by moving arms 21 and 22, which are capable of oscillating in scissor fashion, whilst on the opposite side of the device 10 the bars 19 and 20 are withheld by a stand 23 which also has a portion 24 that functions as an arrest for the stick 17 and 18. On the side where the moving arms 21 and 22 are present, there is also present a plate-type pusher 25 controlled by an actuator 26.

[0018] Above the sticks 17 and 18 there is a basically disk-shaped cutting blade 27 driven in rotation by a motor 28. The assembly consisting of the cutting blade 27 and the motor 28 is in turn controlled in a substantially vertical direction by an actuator 29 along a guide 30 belonging to a support 31.

[0019] Operation of the device for cutting rolls of paper according to the present invention is briefly illustrated in what follows.

[0020] The working principle of the device 10 envisages that the sticks 17 and 18 turn about their axes, as likewise the cutting blade 27 and the feed roller 11.

[0021] Rotation of the sticks 17 and 18 can be derived from the cutting disk 27, or else, as in the case illustrated to furnish an example, may be generated by the feed roller 11 driven by the motor 12.

[0022] In addition, the cutting motion may be impressed on the cutting disk 27, or else on the bars 19 and 20 which support the sticks 17 and 18.

[0023] In the example illustrated, the feed roller 11 is set in rotation by the motor 12, whilst the latter can be displaced along a vertical direction by means of the actuators 15 and 16.

[0024] The sticks 17 and 18 are carried into the cutting position by the moving arms 21 and 22, which are able to oscillate in scissor fashion between a position of disengagement of the rolls of paper and a cutting position.

[0025] The assembly made up of the cutting blade 27

and the corresponding motor 28 is brought down along the guide 30 and carries out cutting until the blade 27 encounters and cuts the cardboard core of the corresponding stick.

[0026] At the same time, the sticks 17 and 18 rotate to allow cutting of all the portions of paper and of the cardboard core.

[0027] When cutting is completed, the arrest 24 is automatically removed, and the pusher 25, driven by the actuator 26, pushes the roll 32 thus cut out of the device 10.

[0028] At the same time, the stand 23 is lifted, and the arms 21 and 22 are divaricated to enable the rolls 32 to be ejected more efficiently.

[0029] Once this cutting cycle is completed, the sticks 17 and 18, now shorter by a length equal to the rolls cut off, are brought back into position for a new cutting cycle, and so forth until the whole of each of the sticks 17 and 18 is completely cut up.

[0030] The characteristics, as well as the advantages of the device for cutting rolls of paper that forms the subject of the present invention emerge clearly from the foregoing description.

[0031] In particular, the advantages consist, first of all, in the fact that, with the device described above, cutting of the sticks is much more precise. The cutting blade, in fact, does not need to pass through the entire diameter of the stick but limits its action to cutting, and hence to penetrating, only as far as the cardboard core, with consequent reduction in play of the blade inside the stick.

[0032] Complete cutting of the roll of paper from the stick is in fact obtained by relative rotation between the cutting blade and the stick.

[0033] In the second place, thanks to the device described it is possible to use cutting blades of relatively small dimensions and of a type available commercially, with consequent reduction in costs.

[0034] In addition, the device described enables cutting of the stick to be carried out at faster speeds thanks to the combination of the rotary motions described. Finally, it is clear that numerous variations may be made to the device for cutting rolls of paper, which forms the subject of the present invention, without thereby departing from the principles of novelty inherent in the inventive idea.

[0035] More in particular, it appears clearly that it is possible to cut the stick making the stick move with rotary motion about the cutting blade.

[0036] A second possibility is that of moving the cutting blade with rotary motion about the stick.

[0037] A third possibility is to combine both of the motions described for cutting the stick by acting on the radius of the latter.

[0038] In the practical implementation of the invention, the materials, shapes and dimensions of the items illustrated may be any whatsoever according to the requirements, and the said items may be replaced with others that are technically equivalent.

Claims

1. A device (10) for cutting rolls of paper comprising at least one cutting blade (27) for cutting at least one stick (17, 18), from which to obtain said rolls of paper, characterized in that it has means for imposing a relative rotation between said stick (17, 18) and said cutting blade (27) during cutting.

2. A device according to Claim 1, characterized in that the means for imposing relative rotation between said stick (17, 18) and said cutting blade (27) comprises a motor (28) which sets in rotation said cutting blade (27).

3. A device according to Claim 2, characterized in that the assembly made up of the said cutting blade (27) and said motor (28) can be controlled in a substantially vertical direction by an actuator (29) along a guide (30) belonging to a support (31).

4. A device according to Claim 1, characterized in that said sticks (17, 18) are supported by a feed roller (11) driven in rotation by a motor (12).

5. A device according to Claim 4, characterized in that said feed roller (11) may be displaced along a substantially vertical direction by means of actuators (15, 16).

6. A device according to Claim 1, characterized in that, inside the cardboard core of said sticks (17, 18) supporting bars (19, 20) are present.

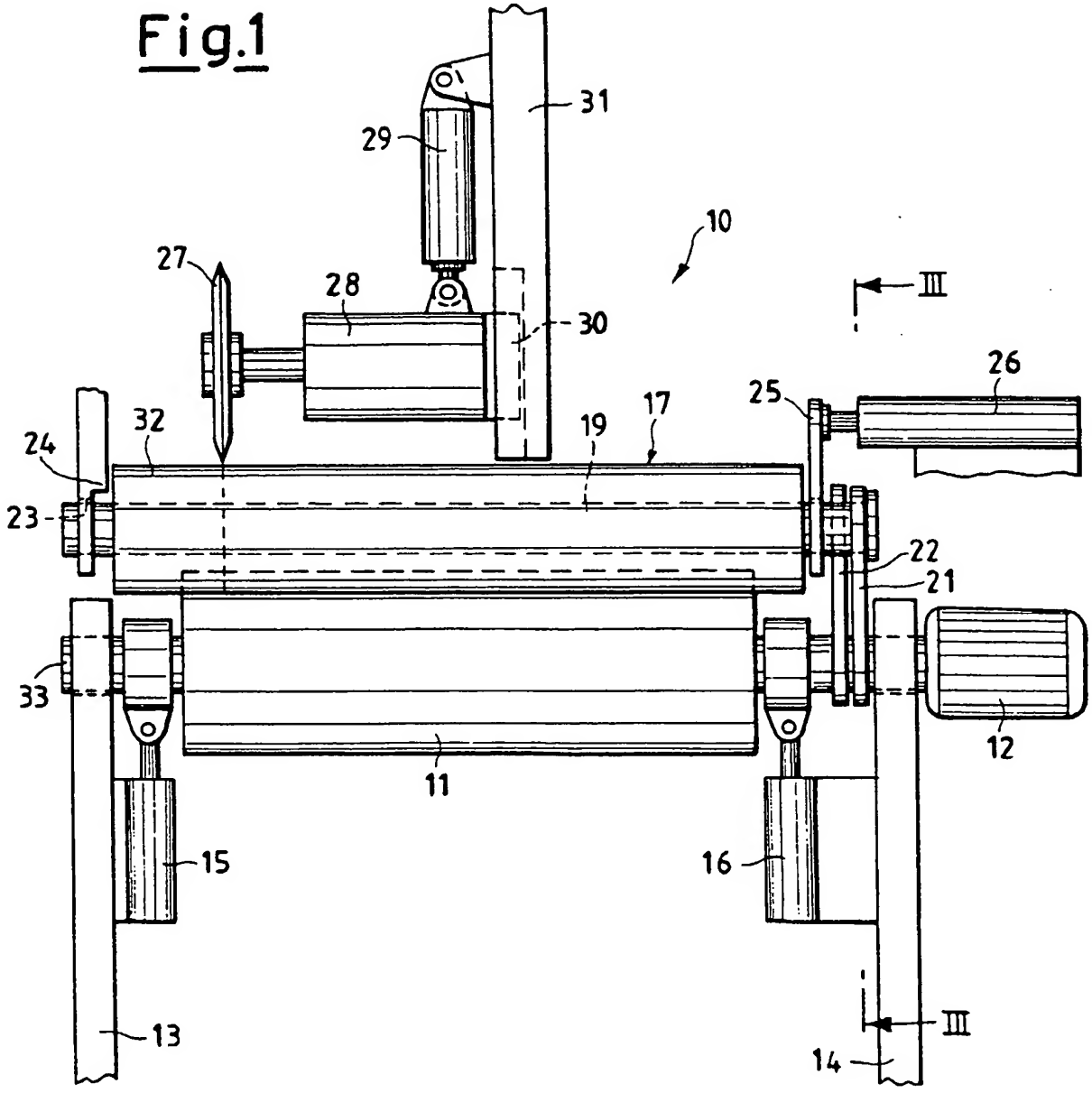
7. A device according to Claim 6, characterized in that said bars (19, 20) are provided with holes for blowing of air under pressure so as to create a cushion of air between the cardboard core belonging to the stick (17, 18) and the respective bar (19, 20).

8. A device according to Claim 6, characterized in that said sticks (17, 18) are two in number and in that the respective bars (19, 20) are supported by moving arms (21, 22) that are able to oscillate in scissor fashion between a position of disengagement of the rolls of paper and a cutting position.

9. A device according to Claim 1, characterized in that said sticks (17, 18) are held in position by a stand (23) equipped with arrests (24).

10. A device according to Claim 1, characterized in that a pusher (25) is provided, which is operated by an actuator (26) for ejecting the rolls of paper (32) after cutting.

Fig.1



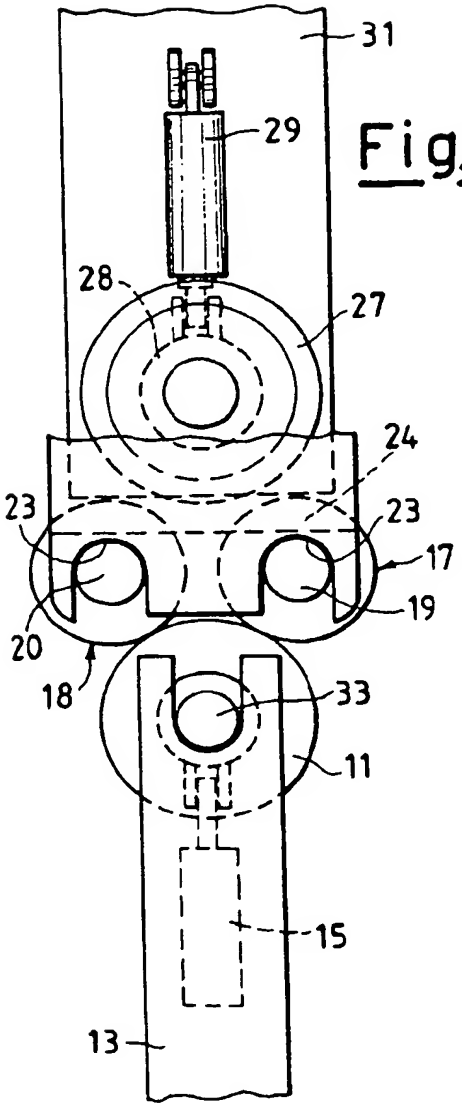


Fig.2

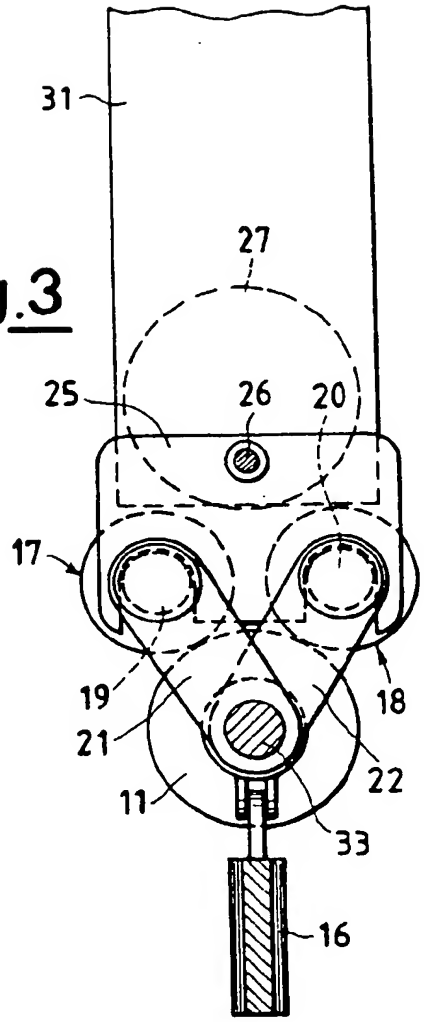


Fig.3

Fig.4